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ABSTRACT

As part of a series of studies on the long-term academic outcomes of fall 1990 first-time freshmen, Maryland's Prince George's Community College (PGCC) undertook an analysis of the cohort to determine the role of race or ethnicity as a predictor of academic achievement after four years. Academic achievers were defined as those students who had received an associate degree or other award, transferred to a senior institution, or were sophomores in good standing. The analysis, based on outcomes of 2,643 first-time freshmen, revealed the following: (1) white cohort members were two and a half times more likely to reach achiever status after four years than non-white members; (2) while racial background was the most powerful single predictor of achievement of all social and educational background variables, it counted for only seven percent of the total variance of achiever classification; (3) student gender, age, marital status, immediate or delayed entry after high school were found to be low level predictors of achievement; and (4) racial background as a predictor of success was almost entirely a function of how different racial groups functioned academically, with white students concentrated in processes that enhanced success, and black students concentrated in opposite processes. Data tables are included. (BCY)

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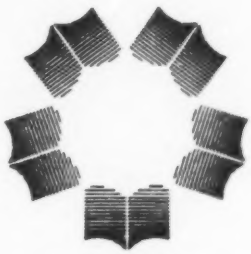
Tracking Student Progress at PGCC

Student Racial Background and Cohort 1990
Four-year Academic Outcomes



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Enrollment Analysis EA96-6

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TRACKING STUDENT PROGRESS AT P.G.C.C.: STUDENT RACIAL BACKGROUND AND COHORT 1990 FOUR-YEAR ACADEMIC OUTCOMES

Enrollment Analysis EA96-6
June 1996

Introduction

This is the third four-year academic outcomes report[1] based on the Office of Institutional Research and Analysis's tracking of a cohort of first-time freshmen (N = 2,643) entering in the Fall of 1990.[2] This time the focus will be on student race/ethnicity. The research explores how Cohort 1990 racial background interacted with other social and educational background variables and with indicators of academic progress and term attendance to predict levels of academic achievement after four potential years of study at PGCC.

This topic is especially pertinent to Prince George's Community College. The college serves a county the population which became majority non-white by the time of the 1990 U.S. Census (50 percent African American, 4 percent Asian or Pacific Islander, 4 percent Hispanic, 1 percent Native American and "Other", 42 percent White). The college's student body closely reflects its service area racial characteristics; in fall 1990, for example, of the 13,087 credit students enrolled, 48 percent were African American, 5 percent Asian or Pacific Islander, 3 percent Hispanic or Native American, 44 percent White. The 1990 Fall entering freshman cohort itself broke down 52 percent African American, 6 percent Asian or Pacific Islander, 38 percent White. If enrollment retention and academic performance are

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[1]See *Tracking Student Progress at P.G.C.C.: Basic Findings of the 1990 Entering Cohort Academic Outcomes Analysis* (Enrollment Analysis EA95-7, June 1995) and *Tracking Student Progress at P.G.C.C.:Fall 1990 Entering Cohort Four-Year Patterns of Attendance and Timing of Outcomes* (Enrollment Analysis EA96-1, July 1995).

[2]The Cohort 1990 data set is drawn from PGCC student record databases, augmented with material supplied by the Maryland Higher Education Commission's Transfer Student System to enable us to identify cohort members who ceased community college attendance due to transfer to a Maryland four-year public post-secondary institution. Attendance, study progress and related data are all organized on a term-by-term basis so that we may assess student academic status and level of achievement at any point in the four-year process, connect patterns of attendance with outcomes, and summarize any part of the process in terms of time to outcome.

significantly linked to racial background, as the higher educational research literature suggests, then we might expect race/ethnicity to have a heightened impact on student success at Prince George's Community College, given the exceptional cultural diversity of its student body. Understanding how race and learning interact at PGCC should prove to be of prime importance to the college's academic policy planners.

On the other hand, we should exercise caution in generalizing any findings concerning the link between race and academic achievement at PGCC to community colleges as a group. The very exceptionality of the college's racial diversity might lead to a unique cultural/educational dynamic not characteristic of that functioning within the student bodies of most other two-year institutions.

Furthermore, the racial composition of Prince George's County and the student body of PGCC are unique not only in their non-white skews but also in the way their populations distribute socio-economically. Prince George's County is an affluent suburban jurisdiction (one of the 100 wealthiest in the country according to the 1990 U.S. Census) bordering the District of Columbia. It is famous for the strength of its African American *middle class*, the result of a substantial, continuing influx of non-white ex-Washingtonian federal government workers which began in the 1970s. For example, the U.S. Census Bureau reported that in 1990 the national median annual household income for African Americans was $18,400 compared to the Prince George's African American median of $37,700. The latter figure can even be favorably compared to the national median for whites – $31,200. And although *personal* income data does not exist for our 1990 PGCC student body, research based on Census tract data connected with student addresses implies that African American new students at PGCC also rank relatively high on the socio-economic scale as a group -- estimated mean household income for black cohort members: $44,500.[3] The affluence of both the county's residential population in general and its community college population in particular, including non-white segments in both instances, must be taken into account when considering how widely our findings may apply.

Methodological Considerations

Measuring Academic Achievement. As before, the principle measure of final academic outcome derives from OIRA's student achievement paradigm, developed specifically for use in student cohort analysis. The paradigm identifies two varieties of study success – formal (attainment of associate degree, transfer to a four-year

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[3]Each student was assigned as the estimated income of his or her household the 1990 median household income figure for the county Census tract including the student's 1990 address.

higher educational institution[4] or both) and informal (accumulation of 30 credit hours equaling sophomore status and maintenance of 2.0+ passing grade point average). Cohort students who qualify for placement in either or both categories of academic success after a set interval from initial enrollment, in this case four years, are classified as "academic achievers."[5] The informal category is a recognition of the fact that in a community college setting many students may not have conventional academic goals but nevertheless register solid academic accomplishments which ought to be acknowledged.

The paradigm's residual categories are "pipeliners" (continuing students not yet sophomores or not in good academic standing at the time of assessment), "drop-outs" (exiters without degrees, transfers or sophomore in good standing status) and "special motive students" (those stating reasons for attendance other than degree-earning or transfer on their initial college application form who attended only one or two of the first year terms). This last category is OIRA's attempt to identify those who clearly had only short-term, non-academic motives for enrollment (e.g., to brush up on a foreign language) and therefore do not really constitute part of the main "degree-seeking" student body. In all that follows, the reported analyses exclude the special motive students; only degree-seekers are counted (N = 2,386).

Race/Ethnicity and Other Background Variables. Most of the social background variables are drawn from student records data and represent college application form self-reporting. The race/ethnicity indicator derives from a five-category forced single choice item (White/Black or African American/Hispanic or Spanish-Speaking/Asian or Pacific Islander/Native American or American Indian). Student response was required. In our analyses for this report, we often combined race/ethnicity with a related variable – U.S./Foreign Student – formed from responses to application form questions on U.S. citizenship and Student Visa Type. Thus we were able to

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[4]To be included for tracking by the TSS, a student must have transferred at least 12 credits to a Maryland public college or university; students transferring fewer credits, or who transferred to Maryland four-year private, out-of-state or any two-year schools or training programs are invisible to the system. These database limitations result in an under-reporting of the degree of transfer attainment actually achieved by Maryland community college students tracked by TSS. Past OIRA research suggests that using TSS may yield an underestimate of the genuine transfer rate by as much as 50 percent in PGCC's case. See *The Post-Secondary Market in Prince George's County: An Analysis of the Community Needs Survey* (Market Analysis MA96-1, September 1995).

[5]Even after four years of potential study, a few students with 2.0+ GPAs who have advanced to sophomore status continue to attend but have yet to either graduate or transfer; many more sophomores in good standing cease enrollment at PGCC, for whatever reason, before either earning degrees or transferring. Of the formal achievers, degree earners must be at least sophomores in good standing but those who transfer without degrees, a large and growing group, may leave for their new school before accumulating 30 credit hours.

differentiate, for example, between true African Americans and international students of Caribbean or African origin. Other student application form-derived social background variables employed in this study included gender (Female/Male), age (Under 20 Years of Age/20 Years or Older), and marriage status (Never Married-Separated-Divorced-Widowed/Married-Living with Spouse).

Two other social background variables originated in an analysis of student residential location in the light of 1990 U.S. Census data. Using address-analyzing computer software it was possible to place student residencies within their respective U.S. Census tracts and therefore sort students according to the socio-economic characteristics of their residential neighborhoods. To investigate the role of social class in PGCC academic achievement, a Neighborhood Social Status indicator was constructed which broke students down into one of three broad SES categories (those living in tracts characterized by high, medium and low levels of income, education and job status).[6] The second variable – Percent Neighborhood White – sorted students by their known residential tracts into those living in neighborhoods 67 percent or more, 33-66 percent or less than 33 percent white in population racial composition. The purpose of this variable was to give us some means to gauge how student race and the racial composition of the home community might have interacted to produce educational effects.

The two educational background variables were mainly drawn from student record data. The entry timing from high school indicator, based on comparing year of high school graduation or equivalent with the college entry year (1990), divided students into those who came to PGCC immediately (within one year) after high school graduation and those who delayed PGCC enrollment for more than a year after receiving their diplomas.[7] Type of High School Attended grouped cohort students into those graduating from county private secondary schools (all ten save one either Catholic parochial or protestant denominational or church-based), those from county

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[6]Specifically, this involved utilizing a Census-data based college marketing tool developed by OIRA known as *PG-TRAK^{90}*, which divides all 172 Prince George's County Census tracts into 15 highly homogeneous groupings of neighborhoods through cluster analyzing their socio-economic, housing and cultural characteristics. The 15 clusters were rank-ordered according to a SES index averaging z-scores for annual household income, percent college graduates and percent in executive or professional jobs, and the results trichotomized. Cohort students, neighborhood cluster codes already established, were then assigned to the three large SES categories. For more information on this marketing system and its methodology, see PG-TRAK^{90}*: Prince George's Community College's Lifestyle Cluster Marketing System* (Market Analysis MA93-1, November 1992).

[7]The second category also included the very small number of students without known high school diplomas or for whom we had no data on high school graduation or attendance.

public high schools, and those from non-county secondary schools or with G.E.D.s.[8] Additionally, the county public high school category was split into those who had attended high reputation institutions and those graduating from schools with indifferent or poor reputations.[9] This permitted the construction of a dichotomous form, separating cohort students with "elite secondary school backgrounds" (private school or high reputation county public high school) from all others.

Academic Process Variables. The last set of variables we entered into the analysis measured various aspects of cohort student behavior in the midst of the academic process leading to final academic outcome – e.g., number of placements into remediation programs or tendency to attend full-time or part-time. The way these "foreground" variables interact with race/ethnicity and other social/educational background variables may provide important clues to why overall academic achievement rates vary among certain background groups.

In rough order of placement in the causal flow, the academic process variables selected for review in this study included mean development placement testing score (four levels from very low to very high)[10], number of remedial programs required (0-3), completion/failure to complete all developmental requirements after four years[11],

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[8]Plus non-graduates and those with unknown high school backgrounds.

[9]According to the judgment of a panel of PGCC staffers with good professional or personal knowledge of the county's secondary educational system. Panelists were instructed to assign a school to the "high reputation" category if it had a positively-regarded major "magnet" program or otherwise featured course instruction of exceptional quality.

[10]At PGCC, all entering students are expected to take all three developmental placement tests of basic skills college preparedness (reading comprehension, English language usage and mathematics) before beginning their first term of study. Some, however, manage to delay taking one or more of the tests until subsequent terms and a small minority (10 percent in the case of Cohort 1990 students) manage to avoid placement testing entirely. This usually occurs as a result of placement waivers given to students who provide other evidence of skills competence to academic counselors, but in some instances avoidance is simple failure to comply with college policy. Under the rules governing Cohort 1990 students, failure to comply normally meant preclusion from enrollment in key introductory credit courses necessary for the completion of general education requirements and entrance into most course streams leading to an associate degree in a particular field of study. In this study, frequency and cross-tabular reporting for the mean placement score variable will exclude cohort students who took no placement tests, for what ever reason, but will include students with post-first term test scores. It will also exclude testing results based on tests not in the Comparative Guidance and Placement (CGP) series used by the College Placement and Testing Office during the first two years of the life of Cohort 1990; thereafter the CGP tests were replaced by those provided by the Descriptive Test of Language and Mathematics Study (DTLMS) service.

[11]Frequency and cross-tabular reporting involving this variable will exclude non-developmental students from the base.

mean major term study load in number of credit hours attempted (dichotomized into 9+ hours or less than 9 hours), continuation as a student beyond the first year of study/dropping out in the first two terms, sequential term attendance/discontinuous attendance (any "stopping out" behavior)[12], passing core requirement course English 101/not taking or passing English 101, a 2.0+four-year cumulative GPA (passing average)/a GPA of less 2.0, and a four-year credit accumulation of at least 20 hours/less than 20 hours earned.

Analytic Techniques and Statistics. The research techniques used in this study were frequency and cross-tabular analysis and multiple regression. The association measure employed in conjunction with cross-tabular analysis was the *Eta* coefficient, a correlation gauge appropriate when independent variables are non-parametric and the dependent variable, e.g., academic achievement, is dichotomous or represents the presence or absence of a quality (0/1).[13] The multivariate results reported below are all based on multiple linear regressions of social/educational and academic process variables upon the dichotomous academic achievement variable.

Technically speaking, non-parametric independent variables and a dichotomous dependent variable call for *logistical* rather than linear regression, but practical statisticians have discovered that for most data sets there is little difference in substantive outcome.[14] Linear regression yields much more intuitive, easier to interpret results, and since our purpose here was merely to summarize in the most convenient fashion how our independent variables simultaneously acted upon likelihood of academic achievement rather than to create a definitive causal model, we elected to use linear regression.

The regression-based tables to follow give estimates of the collective impacts of sets of independent variables upon achievement in terms of Pearson's coefficient

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[12]Frequency and cross-tabular reporting involving this variable will exclude cohort students not continuing into the second year from the base.

[13]The *Eta* coefficient may be thought of as the non-parametric version of Pearson's product moment correlation coefficient *r* used for continuous scaled data; in fact, the value outcome of calculating *Eta* and *r* when correlating two dichotomous variables is identical, except that *Eta* is reported without plus or minus signs indicating direction of relationship. *Eta* always varies in value between 0 and 1; 0 indicates complete absence of an x/y relationship while 1 stands for total dependency of y upon x (in the two dichotomous variables instance, all cases falling on one or the other diagonal of the four-way table) . Our tables also sometimes report what might be called partial-*Eta*s. These are *Eta* associations between two variables controlling for the effects of a third variable, and are calculated by taking the mean of all x-by-y *Eta*s within each category of control variable z.

[14]To confirm this as true for our Cohort 1990 data set, we ran parallel logistical regressions for all linear regressions carried out in this study, with corroborating results in each case.

of determination (R and R^2) and of the relative impact of any single independent variable, controlling for all other independent variables in the equation, by means of Pearson's partial correlation coefficient (partial r and partial r^2).[15]

Race/Ethnicity and Academic Achievement: Basic Findings

As has already been mentioned, long-term regional population redistribution trends (African American in-migration from the District and to a lesser degree out-migration of white residents to the farther suburban jurisdictions) gave Prince George's County a "majority minority" residential base by 1990. Always responsive to shifts in county demography, Prince George's Community College's student body experienced a concomitant shift. For example, non-white students constituted little more than a fourth (29 percent) of all Fall 1975 credit enrollees, but this group grew to 41 percent by 1980, 44 percent by 1985, reaching majority status (51 percent) for the first time in 1988; at this writing (Spring 1996) PGCC attenders from African American, Hispanic, Asian and Native American backgrounds make up nearly three-quarters (73 percent) of the overall credit student body.

Table 1. Fall 1990 Entering Freshman Cohort* by Student Race/Ethnic Background and Citizenship

Sub-Sample Groups	White	Non-White	Non-White: African Descent	Non-White: Hispanic	Non-White: Asian/ Pacific	Non-White: Native Amer.	*N*
Whole Cohort	38 %	62 %	52 %	3 %	6 %	<.5 %	*2,386*
U.S. Citizens/Residents	41 %	59 %	53 %	2 %	3 %	<.5 %	*2,212*
International Students	9 %	81 %	39 %	10 %	42 %	--	*174*

* Degree-seeking cohort members only

[15]Pearson's R and R^2 always range between 0 and 1 (no sign). Given the non-parametric nature of our data, R may be thought of as the multiple-*Eta* association of all independent variables with achievement. But from the standpoint of gauging the true predictive effectiveness of a regression equation, R^2 is by far the most useful of the two, and is usually intuitively described as the actual proportion of the total variation in the behavior of the dependent variable explained by all the causal variables acting simultaneously. Analogously, partial r might be looked at as the partial *Eta* of x-by-y when *all* other independent variables are controlled for, while partial r^2 may be taken to represent the proportion of the total variance of the dependent variable explained by a single independent variable when all other such variables are controlled for.

Table 1, above, shows how the entering freshman component of the overall Fall 1990 credit enrollment at PGCC (n = 2,386) broke down by race/ethnicity and national citizenship/residence. More than three in five of all cohort members (62 percent) proved to be non-white. Students of African descent alone made up more than half (52 percent) of the total cohort and overwhelming dominated the non-white segment (85 percent). Other non-white groups were present as follows – students with Asian or Pacific Islander backgrounds 6 percent, Hispanic or native Spanish-speaking students 3 percent and Native American/American Indian students less than half a percent. PGCC is not a Mecca for international students, the table also suggests. In 1990, only 7 percent of all entering freshman were non-U.S. residents (n = 174).[16] Of those from foreign climes who did start college here in 1990, fewer than one in ten (9 percent) of these were of European descent. Most international students came to PGCC from Africa or the Caribbean Islands (39 percent) or from Asia or the Pacific Islands (42 percent); only 10 percent of the visa-bearing students hailed from countries with a Latin culture.[17]

How did the diverse cultural heritages found among members of Cohort 1990 relate to likelihood of educational success after four years of potential study? This is the theme of Table 2, below, which gives the race/ethnic group percentage break down across all categories of OIRA's academic achievement paradigm. The rows in the top half of the table represent the logically discrete categories of the four-year outcome scheme. The figures shown there are column percentages indicating how cohort members distributed themselves overall and by four racial segments of the cohort in terms of the paradigm. The unitalicized percentages for the three main paradigm categories – Achievers (associate degree earned or transfer to four-year institution obtained or otherwise a sophomore status with a cumulative 2.0+ GPA), Continuers ("non-achievers" who were still taking courses after four years) and Drop-Outs ("non-achievers" terminating enrollment before the end of four years) – sum to 100. The italicized figures provide the breakdown by specific types of achievement (transfer only, award only, both transfer and award, or sophomore/passing GPA status only) and sum to total Achiever percentage. The bottom half re-groups the

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[16]According to the Census Bureau, legal immigrants, residential visitors and other aliens from what used to be called the Third World were only just beginning to make a discernable demographic impression on the county in 1990. The growth curve for this group, however, is sharply upward and by the start of the new millennium international students may well be established as an important component of the PGCC student body.

[17]In 1990, Asian/Pacific Islanders and Hispanics, of whatever citizenship or residential status, were present in the county population in roughly equal proportions – 2.6 percent and 2.2 percent, respectively. This suggests that Hispanics, compared with Asian/Pacific Islanders, were somewhat under-represented among all freshmen of that year, and probably seriously under-represented among foreign freshmen.

above divisions into meaningful supplementary categories: total percent obtaining a transfer, total percent earning an award, percent traditional achievers (award or transfer or both), percent all continuers (whether or not sophomore in good standing) and percent exiters (any students terminating attendance before four years without either a degree or a transfer). The column percentages here sum to over 100 due to category overlapping.

Table 2. Fall 1990 Freshman Cohort Degree-Seekers:
Race/Ethnic Self-Identification by Four-Year Academic Outcome Categories
(Column Percentages)

Discrete Outcome Categories (Sum = 100 %)	% ALL*	% White	% Non-White	Non-White: % African Descent	Non-White: % Hispanic	Non-White: % Asian/ Pacific
ALL ACHIEVERS	28	41	21	18	20	44
Transfer Only	*9*	*16*	*6*	*4*	*3*	*21*
Transfer & Award	*2*	*4*	*1*	*1*	*0*	*3*
Award Only	*4*	*5*	*3*	*3*	*1*	*3*
*Soph./GPA 2.0+ **	*13*	*16*	*11*	*10*	*16*	*18*
CONTINUERS ONLY[!]	7	5	9	9	9	6
DROP-OUTS[!!]	65	55	71	73	71	51

Overlapping Categories (Sum = >100 %)	% ALL*	% White	% Non-White	Non-White: % African Descent	Non-White: % Hispanic	Non-White: % Asian/ Pacific
All Transferrers	12	20	7	5	3	23
All Award Earners	6	9	4	4	1	6
Award &/or Transfer	16	25	10	8	4	26
All Continuing[!]	13	11	14	14	14	12
All Exiters[!!]	71	64	75	78	81	62
TOTAL N	*2,386*	*911*	*1,475*	*1,248*	*70*	*146*

NOTE: Sub-category %s may not precisely sum to whole category percentages due to rounding error
* Includes small Native American sub-sample (n = 11)
** Excludes sophomores in good standing with an award or transfer by end of Year 4
[!] Students still enrolled after 4 years without award, transfer or sophomore in good standing status
[!!] Students exiting before 4 years without award, transfer or sophomore in good standing status
[!] Students still enrolled, whether or not sophomores in good standing
[!!] All students exiting without an award or transfer, whether or not sophomores in good standing

The overall achievement rate for the Fall 1990 freshman cohort was 28 percent, according to Table 2. The four racial groups within the cohort, however, vary significantly from this standard. Over two-fifths (41 percent) of the white cohort students classified as academic achievers after four years, while under a fifth (18 percent) of cohort students of black African descent did so. In effect, all things equal the average African-descended freshman at PGCC proved to be less than half as likely (.44) to succeed than the typical white student. Similarly, cohort members of Latino heritage as a group showed a relatively low rate of academic achievement (20 percent). White students, however, were not the most successful racial segment in the cohort; that distinction went to Asian heritage students, 44 percent of whom either earned a degree, transferred to a four- year institution or gained sophomore in good standing status by the end of four years at PGCC.

Furthermore, qualitative differences among the racial groups existed in type of achievement. While the percentage of students making the achiever cut solely on the basis of sophomore in good standing status varies only slightly (16-18 percent) among white, Asian/Pacific and Hispanic segments, the black student segment registered 10 percent in this sub-category of achievement. And, using the more stringent standard of performance– degree or transfer – differences were even more pronounced: Asian/Pacific students 26 percent, whites 25 percent, blacks 8 percent, Hispanics 4 percent. Table 3 clarifies these trends by expressing them in terms of sub-category percentages of all achievers:

Table 3. Race/Ethnicity by Type of Achievement

Achievement Type	% ALL	% White	% African Descent	% Hispanic	% Asian/ Pacific
% AWARD OR TRANSFER	55	62	45	21	59
% Transferring	*42*	*49*	*29*	*14*	*53*
% Earning Degrees	*13*	*13*	*16*	*7*	*6*
% SOPHOMORE/GPA 2.0+	45	38	55	79	41
TOTAL N	*672*	*370*	*222*	*14*	*64*

Among white and Asian achievers, the preponderance of success classifications resulted from graduating or transferring or both (62 and 59 percent, respectively); the reverse was true of black and Hispanic achievers, a substantial majority of whom made the cut solely on the basis of sophomore in good standing status (55 and 79

percent, respectively. In addition, Table 3 reveals that in cases where achievement featured the traditional accomplishments of degree or transfer, among whites and especially Asian students a disproportionate frequency of traditional achievement involved transfers.[18]

The last table in this series also relates cohort race/ethnicity with academic outcome paradigm classification, but goes beyond Table 3 by further dividing the four racial segments along citizenship lines (U.S. citizen or permanent resident/non-citizen with temporary residential status).

Table 4. Four-Year Academic Outcome by Race/Ethnic Self-Identification and Citizenship

Overlapping Outcome Categories	U.S. CITIZEN/PERM. RESIDENT				NON-CITIZEN/VISA			
	White	African Amer.	His-panic	Asian/ Pacific	White	African Desc.	His-panic	Asian/ Pacific
ALL ACHIEVERS	41	17	21	43	33	34	17	45
Transferrers	*20*	*5*	*4*	*29*	*27*	*3*	*0*	*18*
Award Earners	*9*	*4*	*0*	*8*	*0*	*4*	*6*	*3*
Both Award/Transf	*25*	*8*	*4*	*33*	*27*	*6*	*6*	*19*
Soph../GPA 2.0+	*16*	*9*	*17*	*10*	*7*	*28*	*11*	*26*
CONT. (Any Sort)*	12	14	13	8	0	22	17	16
DROP-OUTS**	55	74	69	55	67	60	78	47
TOTAL N	*896*	*1,180*	*52*	*73*	*15*	*68*	*18*	*73*

* Students still enrolled after 4 years with or without award, transfer or sophomore in good standing status
** Students exiting before 4 years without award, transfer or sophomore in good standing status

The pattern of race/ethnicity by achievement in the left hand portion of Table 4 (U.S. students) basically repeats that found for all cohort students in Table 3, since the great bulk (93 percent) of all Fall 1990 freshman at PGCC were either U.S. citizens or permanent residents. It is the right hand portion, singling out the small number of international students for analysis (n = 165) which contains the interesting new information to be gleaned from Table 4's figures. For three of the cohort's racial

[18]Around 59 percent of Asian achievers earned either degrees or transfers or both; also, 53 percent of Asian achievers went on to four-year schools. Comparing these two percentages implies that 90 percent of traditionally achieving Asians students were transfers. The parallel figures for the traditional achievers in the other cohort racial segments were white transfers 79 percent, Hispanic transfers 67 percent, black transfers 64 percent.

segments, citizenship differences did not appear importantly to effect the basic pattern of the race-achievement link. The cohort's Asian heritage segment ranked highest in percent achievers whether its students were U.S. citizens or permanent residents (43 percent) or from foreign shores (45 percent). White U.S. cohort members only marginally outperformed white international students after four years of study (41 to 33 percent, respectively. And Hispanic students, whether U.S. or international, registered relatively low rates of achievement (21 and 17 percent, respectively).

The surprise comes when comparing the four-year academic outcomes of U.S. and international students of African descent: cohort members from sub-Saharan Africa and the Caribbean region out-achieved African American students by precisely 2-to-1 (17 to 34 percent, respectively). The relatively greater academic success of black international students, however, was mostly due to their thrice greater tendency to classify as sophomores in good standing after four years, compared with African American students (28 and 9 percent, respectively).

The percentages of traditional achievers in the total African American group (8 percent) and black international group (6 percent) did not differ significantly; what did differ, and radically, was the extra proportion of black international sophomores in good standing – 18 percent more than that for the African American group. A possible explanation for the phenomenon in question is that, when faced with difficulties and delays black international students may have less often refused to give up on their scholarly objectives. On the other hand, African American students, who became convinced that quick attainment of traditional goals were beyond their reach, may more often have chosen to drop out rather than accept late sophomore study as a prelude to even later graduation or transfer. In other words, the key may be group differences in *persistence*. This possibility is supported by another Table 4 finding: the proportion of all varieties of four-year continuing black international students (22 percent) proved to be more than half again as large as that of African American students (14 percent).

To summarize our findings thus far, it would appear that at the most elemental level of analysis PGCC student likelihood of academic achievement does vary significantly by racial background. Several qualifications, however, are in order. First, the impact of racial background upon study success did not work out along traditional white/non-white student lines. Second, the force of race did manifest itself dichotomously, but the true division turned out to be white but also Asian/Pacific students on the enhanced success likelihood side and African-descended and Hispanic students sharing the depressed success likelihood side. Third, this sorting held whether academic success standard was overall achievement (including

attainment of sophomore in good standing status), traditional community college achievement only (earning an associate degree or four-year school transfer or both) or just going on to pursue baccalaureate studies (transfer to a four-year school as a separate category). Fourth, one racial background group of cohort students – those of African descent – displayed a complex academic performance pattern when nationality was taken into account; specifically, black international students out-achieved African American students quite dramatically.

The above findings suggest that while being European in heritage increases a student's chance of graduating, transferring or attaining sophomore in good standing status, being from a racial minority background in white-dominated America does not, in and of itself, spell a diminished likelihood of academic success, at least while at PGCC. The relative high level of performance of Asian/Pacific students generally, and of the contingent of African descended students from overseas, argues that the cultural dynamics specific to each heritage group requires factoring in.

The remainder of this investigation will focus on what happens to the role of race/ethnicity as a predictor of study success at PGCC when a whole host of other relevant background and academic process variables are added to the analysis. Because shifting to the multivariate level of analysis will vastly complicate the data reporting task, from this point forward, U.S. Asian/Pacific, U.S. Hispanic and all international students will be dropped from the cohort database. Since U.S. white students (n=896) and African American students (n=1,180) made up over 93 percent of the Fall 1990 freshman cohort, this simplification in the form of the racial background variable should allow for far more readily interpretable data tables with little compromise in the logic of the analysis.

The Effect of Other Social/Educational Background Variables

The simple two-way analysis just discussed established that, all things being equal, racial background was an important correlate of academic achievement at PGCC. Given the complexity of social reality, however, where all things are never equal, we must now broaden the analysis to include other background variables. There are two main reasons for this: First, though race/ethnicity proved to be an important predictor, its relatively modest explanatory power left a great deal of room for the operation of other social and educational background factors. Second, it is important to test for the possibility of statistical spuriousness before accepting that there exists a substantial link between race and academic achievement. For example, how much of race's apparent connection with level of academic performance might be the result of a prior robust correlation between race and social class in combination with a superior class-performance link? This section of the report will concern itself with these and related issues.

Table 5. Race by Social/Educational Background Variables			
Background Groups	All	U.S. White	African Amer.
High Neighborhood SES	20 %	39 %	5 %
Medium	54 %	55 %	54 %
Low	26 %	6 %	41 %
Eta	--	.506	
% N'hood 67% + White	16 %	33 %	3 %
33-66 % White	58 %	63 %	53 %
Under 33 % White	26 %	3 %	44 %
Eta	--	.546	
Private School HS	7 %	13 %	3 %
High Rep. PG Public HS	26 %	41 %	15 %
Other PG Public HS	37 %	20 %	50 %
Other HS History	29 %	26 %	32 %
Eta	--	.398	
Immediate Entry from HS	59 %	63 %	56 %
Delayed Entry	41 %	37 %	44 %
Eta	--	.064	
Under 20 Years Old	66 %	68 %	63 %
20 Years or Older	34 %	32 %	37 %
Eta	--	.050	
Never Married/Other	88 %	87 %	89 %
Married-Living with	12 %	13 %	11 %
Eta	--	.027	
Females	58 %	55 %	61 %
Males	42 %	45 %	39 %
Eta	--	.054	

Table 5, above, provides the data on cohort characteristics defined by seven additional social and educational background variables – home neighborhood socio-economic rank, home neighborhood racial composition, type of secondary institution most recently attended, immediacy of PGCC enrollment upon secondary school graduation, age at PGCC enrollment, marriage status and gender. Table rows are arranged by background variable. The rows for each variable show constituent categories plus one for *Eta* value display. The first data column gives the cohort's simple percentage distribution across each variable so that we may get a sense of cohort social attributes in terms beyond race. The next two columns provide race-by-other-background-variable cross-tabulations (race column percentages) with summary *Eta* correlations so that we may gauge how the cohort's racial division relates to larger sociological patterns.

Let's first review the demographic portrait painted by whole sample background category distributions: Beyond being majority African American (57 percent), the Fall 1990 freshman in the U.S. white/black sample proved to be mostly young (66 percent under 20 years of age), overwhelmingly single (88 percent) and more often than not female (58 percent). A majority of our sample members also turned out to be drawn primarily from solidly middle class (54 percent) or upper middle class county neighborhoods (20 percent), and lived in racially mixed communities (58 percent) or predominantly African American areas (26 percent). As one might expect to be true of a group of college freshmen, besides being mostly young and single, they were also likely (59 percent) to have arrived at PGCC almost immediately after graduating from high school. By type of pre-college educational experience, most were products of Prince George's County public secondary institutions (63 percent – 26 percent from high reputation high schools). Only a small proportion (7 percent) graduated from the county's mostly religious private secondary schools.

Table 5's cross-tabulations suggest the following concerning how racial identity correlated with the above mentioned dimensions of social identity: The cohort sample's two racial components showed little divergence when it came to personal factors like marriage status (*Eta* = .027), age (.050), gender (.054) or immediate/delayed entry (.064). Major differences, however, did show up when the remaining variables, more related to social position, were crossed by race. Home Neighborhood Socio-Economic Status, for example, correlated a healthy .506 with racial background; African American compared with white students were a good bit more likely to live in low SES areas (41 to 6 percent, respectively) and less likely to go home to high SES tracts (5 to 39 percent, respectively), although it should be noted that a majority from both racial groups came from neighborhoods of middle SES rank (54 and 55 percent, respectively).

Table 5 shows a similar level of association between sample racial background and percent white of home neighborhood (*Eta* = .546), more African American students tending to live in the least white areas and more students of European descent in the most white areas, but majorities of both groups going home to more or less racially mixed tracts. Finally, African American and white students tended to differ significantly in type of secondary school attended (*Eta* = .398): A majority of white sample members graduated either from one of the county's private secondary schools (13 percent) or from a high reputation county public school (41 percent) while only one in five African Americans did so (3 percent Private School; 15 percent High Reputation Public School).

Table 6. Interaction of Race and Social/Educational Background Variables with Percent Achiever

Background Groups	All	U.S. White	African Amer.	*Race Eta*
RACE SAMPLE	27 %	41 %	17 %	*.266*
High Neighborhood SES	43 %	46 %	22 %	*.174*
Medium	26 %	38 %	17 %	*.232*
Low	17 %	32 %	16 %	*.130*
Background Eta	*.191*	*.092*	*.04*	--
% N'hood 67% + White	47 %	50 %	24 %	*.160*
33-66 % White	26 %	36 %	17 %	*.216*
Under 33 % White	17 %	33 %	16 %	*.106*
Background Eta	*.216*	*.131*	*.036*	--
Private School HS Diploma	51 %	54 %	39 %	*.123*
High Rep. PG Public HS	39 %	49 %	19 %	*.295*
Other PG Public HS	21 %	40 %	16 %	*.251*
Other HS History	18 %	21 %	16 %	*.063*
Background Eta	*.244*	*.255*	*.106*	--
Immediate Entry from HS	34 %	53 %	18 %	*.366*
Delayed Entry	17 %	20 %	15 %	*.062*
Background Eta	*.194*	*.331*	*.046*	--
Under 20 Years Old	34 %	52 %	19 %	*.339*
20 Years or Older	14 %	17 %	13 %	*.066*
Background Eta	*.208*	*.326*	*.088*	--
Never Married/Other Single88	29 %	44 %	18 %	*.293*
Married-Living with Spouse	14 %	16 %	12 %	*.061*
Background Eta	*.108*	*.191*	*.045*	--
Females	28 %	42 %	19 %	*.252*
Males	25 %	39 %	14 %	*.291*
Background Eta	*.034*	*.032*	*.070*	--

As interesting as these patterns may be in their own right, the data in Table 5, however, is provided mainly as background for understanding that found in Table 6, above, which goes directly to the question of how racial background might have interacted with other important social and educational attributes to explain PGCC 1990 freshman cohort academic success. The row and column organization of Table 6 is nearly identical with that of Table 5, but the statistics displayed are quite different. The percentages here indicate *Achiever proportions* of each variable category subsample instead of *distribution proportions* of the whole sample in each variable category. Put another way, Table 6 gives the relevant part (percent Achiever[19]) of a series of cross-tabulations of background variables with the dichotomous academic achievement variable.[20] In the column titled *All* we find the results of the whole sample cross-tabulations of each background variable with achievement.

To illustrate, the cross of Home Neighborhood SES with Achiever Classification is shown here (High SES: 43 percent Achiever/Medium SES: 26 percent Achiever/Low SES: 17 percent Achiever), along with its summary Eta correlation (.191). Similarly, the outlined data in the next two columns (*U.S. White* and *African American*) show the cross-tabulation of each background variable with Achievement, but separately for each of the two racial subsamples. In the SES case, we see that the range of Achiever percentages across the low-to-high categories of the background variable are considerable shorter and the corresponding *Eta* value smaller compared with the whole sample results: 32-46 percent (*Eta* = .092) for white students, 16-22 percent (*Eta* = .040) for African American students, 17-43 percent (*Eta* = .191) for all students.

These results suggest that much of the impact of Neighborhood SES upon academic achievement apparent in the first column was not genuine but rather the indirect effect of a high correlation of both SES and Achiever Classification with Race. SES only looked significantly linked with achievement because higher-achieving white students tended to concentrate in high SES neighborhoods and lower-achieving African American students tended to cluster in low SES areas. This is an example of *statistical control*. Here, when Race is taken into account (*controlled* for) by running the SES-by-Achiever cross-tabulation within each of its category subsamples, much of the original explanatory power of SES proved *statistically spurious*, as

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[19] Since Academic Achievement is a variable with only two categories (Achiever/Non-Achiever), the percentage of Non-Achievers can always be deduced as 100-Achiever percentage.

[20] See Appendix Table A for background variable categorical sub-sample sizes in terms of raw numbers of students.

implied by seriously reduced within-subsample correlations.[21] For all background variables in Table 6, comparison of racial subsample column results with whole sample results is the equivalent of correlating the background variable with achievement, controlling for the effects of Race.

One more aspect of Table 6 should be mentioned before we proceed to the findings. The Achiever percentages in the outlined cells are capable of double-duty. When "read downward" they yield an appreciation of *background variable* impact on achievement controlling for race, but when "read across" they also provide an estimate of the correlation of *race* with achievement controlling for each background variable in tern. For example, the whole sample achievement-by-race relationship is expressed in the table's top row (U.S. Whites: 41 percent Achievers/African Americans: 17 percent Achievers; *Eta* = .266). One would control for the effects of Neighborhood SES by splitting the whole sample into its SES Level subsamples and re-running the race-by-achievement cross-tabulation within each. This is just what the rows of the outlined data already provide (associated correlations displayed in the last column titled *Race Eta)* – High SES subsample whites: 46 percent Achiever/African Americans: 22 percent (*Eta* = .174); Medium SES whites: 38 percent/African Americans: 17 percent (.232); Low SES whites: 32 percent/African Americans: 16 percent (.130). In this case, the only marginal differences between the zero-order correlation of .266 and the three first-order results (.174, .232, .130) suggest that the SES fails to explain away the original moderate race-achievement link, although it does slightly weaken it.

Let's first look at the achievement link pattern for social and educational background variables other than Race/Ethnicity revealed by the zero-order relationship column (All Students). While none of them showed a correlation with Achiever Classification higher than the one for Race/Ethnicity row (.266), several came close: Type of High School Experience (*Eta* = .244), Home Neighborhood Racial Composition (.216), Under 20/20+ Years Old (.208), Immediate/Delayed Entry from High School (.194) and Home Neighborhood Socio-Economic Status (.191). In fact, only two background variables – Marriage Status Single/Other (.108) and Female/Male (.034) – showed a truly trivial level of impact on achievement.

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[21] In the language of statistics, simple two-way relationships of the kind provided by the whole sample column are known as *zero-order* (for zero number of statistical control variables) and three-way relationships of the kind provided in the subsample columns are known as *first-order* (one statistical control). There may, of course, be second-, third- and nth-order relationships (the latter are two-way relationships controlled simultaneously for a large number of other variables). One way of viewing multiple regression, which will be employed shortly in this report, is as an analytic technique for quickly calculating all of the nth-order correlations existing among a large number of variables, each pair controlled for all of the others.

Looking at the same data in plain percentage terms, the following groups showed the most decided tendency to achieve at PGCC: students from private secondary schools (51 percent achievers), from predominantly white neighborhoods (47 percent), from high socio-economic status neighborhoods (43 percent), white students generally (41 percent) and graduates of high reputation public high schools (39 percent). Groups with the lowest achievement rates were students over 20 years old (14 percent), married students (14 percent), African American students (17 percent), those from low socio-economic status or predominantly non-white neighborhoods (both 17 percent), and delayed entry students (17 percent).

At the simple "zero-order" level of analysis (two-variable correlations with no controlling for the effect of third variables), race seems to be just one background predictor of study success among several roughly equally significant background factors. This picture, however, changes when we move to a "first order" level of analysis where correlations are adjusted for the effects of third variables. When Race/Ethnicity was used as a control on the relationship between the other background variables and achiever classification, the effect was pronounced. Some of the other background variables proved to be only spurious predictors of academic outcome, whose apparent ability to influence achiever classification was the result of a high, prior correlation with Race/Ethnicity, the true operating factor. Other background-achievement links proved to be genuine, but nevertheless made their impact felt only in complex interaction with Race/Ethnicity.

As we observed when discussing Table 5, both Home Neighborhood variables – SES and Percent Population White – correlated fairly strongly with Race/Ethnicity (Eta = .506 and .546, respectively). This set up the possibility that the reason why students from high SES or predominantly white communities tended academically to out-achieve those from lower SES and more predominantly non-white areas was because those from such locales were much more likely to be of European descent. This proved to be the case: controlling for Race/Ethnicity, the original robust *Eta*s for SES (.191) and Percent White Population (.216) impact on achiever classification nearly disappeared (SES mean within-race group or partial *Eta* = .066; % White partial *Eta* = .084).[22] The percentage data on Table 6 tells the same tale. Whereas, for example, the proportion of all students classifying as achievers ranged widely from a low of 17 percent (low SES Home Neighborhood) to a high of 43 percent (high SES Neighborhood), the like ranges for U.S. White and African American students, taken separately, were much narrower – 32-46 and 16-22 percents, respectively. In fact,

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[22]Partial *Eta* here equals the mean of the two within race segment achievement by background variable coefficients; in the SES case, for example, the average of .092 (within-U.S. White *Eta*) and .040 (within-African American *Eta*), or .066.

when race was controlled, the power of Neighborhood SES to predict study performance was so weak that the proportion of African American achievers from affluent areas (22 percent) did not even come close to the proportionate level of U.S. White students living in the county's poorest communities (32 percent).

The situation with respect to achievement impact of Type of High School Attended is more interesting. Here Table 6 shows the race effect only moderately affected. The original achievement by High School Experience (*Eta* = .244) does drop off (partial *Eta* = .140) when race is controlled for, but the variable retains its status to a significant degree as an independent conditioner of academic outcome within both cohort racial segments. This is especially true among U.S. White student in the cohort (*Eta* = .255). Moreover, even though High School Experience was a less important predictor of African American student success generally (*Eta* = .106), in one specific categorical instance, Private School Attendance, academic performance was boosted very dramatically – 39 percent of the black cohort members who received diplomas from mostly parochial secondary institutions outside the county's public school system ended up in the achiever camp. This was the single highest success rate registered by any African American background sub-group, and although still below the overall rate of U.S. White students (41 percent), it represented more than a doubling (2.29) of the achiever likelihood among all African Americans in the PGCC Fall 1990 cohort. Unfortunately, only 3 percent of the black students attended a private secondary school (compared with 13 percent of all white cohort members), and attending a high reputation public high school, an option exercised by a greater proportion (15 percent), did not seem to boost their academic prospects much (achiever classification 19 percent). U.S. Whites in our sample, on the other hand, were much more frequently found to be products not only of private schools but of high reputation public schools as well (41 percent), and their chances of success at PGCC seemed enhanced by both types of educational preparation for college (achiever classification – private school graduates 54 percent, high reputation public high school graduates 49 percent).

None of the remaining background variables, having to do with personal attributes, correlated significantly with Race/Ethnicity according to Table 6 (all under *Eta* = .070) and one of them – Gender – showed no outcome explanatory power (*Eta* = .034) . The other three, however, did show some discernable connection with Achiever Classification at the zero-order level (Age partial Eta = .208); Immediate/Delayed Entry .194, Single Status .108) and all of these revealed an interesting pattern of interaction with Race/Ethnicity in their first-order correlations with achievement: The academic achievement rate varied quite significantly across the factor categories, but *only* among the *white members* of the cohort (*Eta*s ranged from .191 to .331). Those who came straight to PGCC from high school, were under

20 years of age and single approximately tripled their chances of achiever classification compared with their opposites (for example, only 20 percent of the white delayed entry students won achiever status white a full 53 percent of white immediate entry persons did so). But among *African American students*, the achievement rate remained low and almost flat across factor categories. The Entry Timing case was typical: Immediate Entry – 18 percent achievers, Delayed Entry – 15 percent, summary *Eta* = .046.

This last finding from Table 6 points to a larger common tendency. Although the effect is most pronounced for the relationships between Achiever Classification and Marital Status, Age and Entry Timing, in fact for all background variables except Gender, achievement Etas were consistently and usually significantly lower within the African American segment of the cohort. While U.S. White student academic success likelihoods varied fairly freely with social and educational background, within the other race segment it was as if the simple fact of African Americanness overwhelmed all other background influences. With one notable but limited exception (private secondary school experience), the odds of four-year educational success for African American freshman at PGCC proved low, almost regardless of their class origins or other sociological attributes commonly correlated with collegiate achievement.

Finally, turning to the race-by-achievement way of looking at Table 6, controlling for the effect of each of the other background variables, we find the following: When the statistical control involved any of the three social/educational position variables (Home Neighborhood SES, Home Neighborhood Racial Composition, Type of Secondary School Attended), the moderate race-achiever link was somewhat weakened but not seriously compromised. For example, the partial *Eta* for race-by-achievement taking into account Neighborhood SES was .179, compared with the zero-order correlation of .266. The comparable partial Etas for Neighborhood Racial Composition and Secondary School Type controls were .161 and .183, respectively. Gender, Immediate/Delayed Entry, Single Status and Age controls also seem to have little effect on the race-achievement link, judging only by the partial *Etas* generated, but in these cases the real story, already touched on in our discussion of non-race background variable correlations with achievement, was the underlieing low academic success probability of African American students almost regardless of other variations in background. Here this phenomenon shows up as an exaggeration of racial differences in achievement in subsamples with attributes promoting study progress but a near elimination of any racial gap in achievement among students sharing attributes less condusive to study progress.

For example, according to Table 6 the zero-order correlation of race and achievement was .266 which dropped to .203 (partial *Eta*) when Age (Under 20 Years Old/20+ Years Old) was introduced as a control. This drop, however, rather than tracing to a lowering of correlation within both age subsamples, the true sign of relative spuriousness, was really the result of averaging two radically different within-age group *Eta*s – Under 20: .339; 20+: .066. The high within-Under 20 age group Eta was more a product of the relative similarity of the achievement rates of young and older African American students than of the achievement disimilarity of young and older whites specifically or students generally.

The last set of data in this section, Table 7 below, resulted from a multiple regression analysis of all of the background variables discussed in this report, including Race/Ethnicity, with achiever classification, summarizing how they simultaneously worked together to affect cohort four-year achiever classification. Since our purpose was exploratory, Table 7 reports only the Pearson coefficients of determination and product-moment correlations generated, dispensing with equation-specific statistics like beta-weights, standard error values and F-test scores. And because our objective here was a quick assessment of relative variable impacts on achievement rather than the construction of an efficient, definitive predictive model, we chose forced entry of all independent variables rather than the more common stepwise analytic introduction of independent variables.

Table 7. Partial Pearson Correlations resulting from Regressing Race and Social/Educational Background Variables upon Academic Achievement ($R = .356$, $R^2 = .123$)

All Variables Simultaneously with Achievement (Forced Entry)				
Variables in the Equation	0-Order r	0-Order r^2	Partial r	Partial r^2
African American/U.S. White	-.266	.071	-.157	.025
Private or Elite Public H.S./Other	.233	.054	.084	.007
Under 20 Yrs Old/20 or Older	.280	.043	.073	.005
Female/Male	.034	.001	.073	.005
% Home Neighborhood White (H/M/L)	.207	.043	.041	.002
Immediate Entry/Delayed Entry from H.S.	.194	.038	.034	.001
Single/Married-Living with Spouse	.108	.012	.026	.001
Home Neighborhood SES (H/M/L)	.187	.035	.011	.000

The first two data columns provide the zero-order Pearson *r* correlation of each background variable with achiever classification independent of all other variables, and r^2, the former's translation into zero-order proportion of variance explained.[23] The second two data columns display partial n^{th}-order *r* and r^2, the Pearson product-moment coefficient and variance explained proportion between achievement and each independent variable, when *all other independent variables* are held constant.

The single most important finding to be derived from Table 7 is how weak in the aggregate the social and educational background variables turned out be as predictors of academic achievement at PGCC. Although the collective association represented by *R* looks fairly respectable (.356), when this figure is re-cast as the more intuitive R^2 equivalent, we discover that all eight background variables we examined altogether could account for only around 12 percent of probability of achievement.

The second important finding in Table 7 is revealed by the Partial r^2 column.[24] Of all background variables entered into the regression, only Race/Ethnicity continued when all other factors were held constant to make anything like an appreciable individual contribution toward explaining study success at PGCC (2.5 percent of achiever classification variance explained). It's achievement weight was more than three times that of the next most important contributor according to Table 7 (Private or Elite Public High School, .7 percent achievement variance explained). Beyond race, social and educational background factors are best described as trace influences who weight upon achiever likelihood is felt only in the aggregate.

As a final point, we should add that regression analysis of background variables upon achiever classification also yielded corroboration of an earlier finding – that the interplay of sociology and academic achievement seemed dampened within the African American segment compared with such within the European descended segment of the cohort. When Table 7's regression analysis was re-run for each group, we found a Pearson *R* collective background impact of .369 ($R^2 = .136$) for U.S. White students but a *R* of only .135 ($R^2 = .018$) for students of African heritage.

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[23]A quick comparison of Table 7 zero-order *Eta*s with the zero-order Pearson *r*s of Table 8 is all that is needed to establish that the parallel coefficient values are very close, often identical. As mentioned before, *Eta* and *r* are first cousins in their underlying mathematics.

[24]For complex reasons of general linear modelling theory, the sum of squares of the n^{th}-order partial *r* coefficients generated by a multiple regression does not typically equal the value of R^2, as one might have expected, but usually falls short of total variance explained by a considerable margin (here, sum of r^2s equals around .05). Nevertheless, the partial r^2s of a regression may be used by an analyst to get a rough-and-ready sense of the relative weights of independent variables in a matrix of influence upon a dependent variable.

Race, Achievement and the Academic Process

If all social and educational background variables, including the most powerful – Race/Ethnicity, metaphorically takes us only 12 percent towards a fully predictive model of academic achievement at PGCC, what factors might be added to take us the remaining 88 percent of the distance? One can think of many candidates for inclusion in the explanatory matrix – home values, personality, motivation and drive, family, job and health circumstance are just a few that come to mind. Psychological, attitudinal and situational factors like these undoubtedly play major roles in conditioning the probabilities of collegiate success.

Unfortunately, data representing the operationalization of such forces are typically not available to institutional researchers in the form of data elements in the registrar's student record files. OIRA is in the process of launching a follow-up survey with a major psychometric dimension to fill in such gaps in the data covering the Fall 1992 freshman cohort, but that is for the future. For the cohort presently in question, we augmented the explanatory battery as best we could from available student record data by adding academic process variables to the mix. Academic process variables are any which defines a student in terms of his or her position or behavior within the education system designed to lead to a college degree or transfer. Examples would be developmental placement, grade point average and continuity of enrollment. Sure enough, academic process variables managed to explain in regression a very large proportion of the statistical variance associated with Fall 1990 cohort four-year achiever classification, between 44 to over 60 percent depending upon exactly which data items made up the independent variable set. This finding, however, must be interpreted with extreme caution.

The problem is mainly a matter of analytic logic. A critic would be right to point out the tautological nature of the link between academic process and academic outcomes. What else would we expect to discover but a high inter-correlation? For the academic process can be considered just the sum of the study steps designed to lead to a college degree or transfer. From this angle, to assert the power of the academic process to determine collegiate achievement comes close to saying merely that good students are likely to crown their studies with success while poor students are not likely to do so.

An answer to this criticism is that, for some analytic purposes, the tautological nature of the relationship between process and outcome is besides the point. If the objective of the analyst is to discover *how* the steps in the academic process work together to channel students into achiever and non-achiever categories, then looking at student placement or performance at each study step taken as a variable correlate

of final outcome makes sense. The academic process can be conceived of as a sort of elimination contest, an obstacle course the steps of which form a sequence of hurdles or obstructions the student must get over, under, around or through before crossing the graduation or transfer finish line. Since each step is a potential balk to academic progress, it becomes, therefore, a valid point of research to seek to establish the "difficulty quotient" of each step, for the whole student body and for various attribute groups within it. In this section of the report, we will examine the differences in how U.S. White and African American students from the Fall 1990 freshman cohort ran the four-year obstacle course of PGCC's academic process.

The pertinent data can be found on Table 8, below. The rows of Table 8 display the categories of a selection of nine academic process variables, in rough order of timing. The first four all have to do with basic college skills possession and remediation: Mean Developmental Placement Test Score (four intervals),[25] Number of Required Developmental Programs based on placement testing (0-3),[26] Completion of All Developmental Requirements,[27] and a summary Level of Basic College Skills variable.[28] The remaining five process variables included a surrogate for Full-Time/Part-Time Study Load based on mean major term credit hours attempted (9 hours or more/under 9 hours), a flag for survival of the critical first year of attendance, a measure of attendance continuity (all major terms attended in sequence/some "stopping out" of enrollment sequence),[29] an indicator of general education requirement progress toward fulfillment (taking and passing introductory English 101), and the key mark of general credit course performance – last term attended cumulative grade point average (2.0+ passing grade level or under).

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[25]Based on any placement test-taking, regardless of number or date of tests; excludes the 206 cohort members who took no placement tests.

[26]"Zero" category includes both students testing out of all developmental requirements and those avoiding any placement testing.

[27]Includes only cohort members requiring remediation in at least one developmental area.

[28]The construction of this variable was guided by a cross-tabular analysis technique known as Automatic Interaction Detection. Developmental education at PGCC is a highly complex system of basic skills testing, standards of placement into various developmental programs, remedial course sequences and standards for program completion, making it impossible to encapsulate student basic skills possession and acquisition in a single straight-forward index such as an additive scale. Essentially, AID determines the best category combinations of a set of non-parametric independent variables needed to maximize the variance of a criterion variable. Put another way, AID identifies the structured way variables relate to produce their best joint effect. The result, in this case, was a four-category variable interpretable as Achievement Effective Level of Basic College Skills: I – High Mean Placement Score or Medium Score/Remediation Completed, II – Medium Score/No Developmental Required or Low Score/Remediation Completed, III –Medium Score/Remediation Incomplete, IV – Low Score/Remediation Incomplete or No Tests Taken.

[29]Excludes cohort members attended only one or two major terms.

Table 8. Interaction of Race and Selected Academic Process Variables with Achievement						
	Group Column Percent			Achiever Row Percent		
Process Groups	All	U.S. White	African Amer.	All	U.S. White	African Amer.
RACE SAMPLE	100 %	100 %	100 %	27 %	41 %	17 %
Mean Placemt Score 60 +	15 %	29 %	5 %	50 %	54 %	31 %
50 - 59	36 %	48 %	28 %	40 %	48 %	28 %
45 - 49	21 %	14 %	26 %	20 %	23 %	18 %
20 - 44	27 %	8 %	42 %	11 %	25 %	10 %
Eta	--	.491		.319	.225	.213
0 Dev Programs Required	43 %	65 %	26 %	38 %	45 %	23 %
1 Required	19 %	19 %	20 %	30 %	40 %	23 %
2 Required	18 %	10 %	24 %	17 %	24 %	15 %
3 Required	19 %	6 %	29 %	10 %	21 %	9 %
Eta	--	.430		.249	.165	.165
Dev. Req./Completed All	20 %	28 %	18 %	48 %	60 %	41 %
Requirements/Incomplete	80 %	72 %	83 %	12 %	21 %	9 %
Eta	--	.120		.364	.373	.337
Col. Skills Index - Level I	22 %	34 %	13 %	51 %	56 %	41 %
Level II	25 %	32 %	20 %	40 %	49 %	30 %
Level III	22 %	17 %	25 %	16 %	23 %	13 %
Level IV	31 %	17 %	43 %	8 %	12 %	7 %
Eta	--	.358		.400	.349	.329
Mean Term Load - 9 + Hrs	55 %	63 %	52 %	41 %	57 %	24 %
Under 9 Credit Hours	45 %	37 %	48 %	11 %	13 %	10 %
Eta	--	.151		.332	.429	.196
Enrollment beyond Year 1	62 %	67 %	58 %	42 %	58 %	28 %
First Yr Attendance Only	38 %	33 %	42 %	3 %	6 %	2 %
Eta	--	.090		.424	.505	.344
No Stop-Outs (3 + Terms)	60 %	63 %	58 %	56 %	72 %	41 %
Some Stopping Out	40 %	37 %	42 %	31 %	48 %	17 %
Eta	--	.062		.253	.242	.252
Gen. Ed. EGL101 Passed	45 %	61 %	33 %	55 %	63 %	44 %
Not Passed/Not Tried	55 %	39 %	67 %	4 %	5 %	4 %
Eta	--	.281		.571	.578	.500
2.0 + Cumulative GPA	56 %	69 %	45 %	48 %	59 %	36 %
Under 2.0 GPA	44 %	31 %	55 %	1 %	0 %	1 %
Eta	--	.242		.530	.550	.464

We have already remarked upon the highly explanatory results of regressions of academic process variables upon Achiever Classification. It comes as no surprise, therefore, that Table 8 reveals robust individual process variable impacts. According to the column titled Achiever Row Percent/All, with two exceptions, process variable

zero-order *Eta* correlations with Achiever Classification exceeded, usually by a good margin, that of the Race/Ethnicity variable (.266), and even the exceptions come close. The range of Eta values runs from .249 (Number of Developmental Programs) to .571 (Passing English 101).

Furthermore, as the adjoining U.S. White and African American subsample columns attest, controlling for the effect of Race/Ethnicity did not explain away these relationships; Eta pairs for the two racial segments tended to remain near the *Eta* summarizing the whole cohort process-outcome association and to each other. Holding Race/Ethnicity constant did significantly reduce (not, however, to the trivial level) apparent achievement correlation in the case of three of the developmental variables. But even here the achievement relationship of the variable constructed to summarize developmental effects – College Skills Level – stayed substantially intact (whole cohort .400, U.S. White students .349, African American students .329).

Two process-achievement relationships were importantly qualified, however. Table 8 shows race-divergent interaction effects at work in the way Study Load and Enrollment Survival influence likelihood of academic success. In both instances, the correlation was minimized among students of African descent while maximized among those of European heritage. For example, while white students averaging 9 or more credit hours a semester proved 4.4 times more likely to classify as achievers than whites with lesser study loads (57 to 13 percent, respectively), a similar comparison among African American students showed close to full-time status improving success chances by only 2.4 (24 to 10 percent).

These trends are clarified by multivariate analysis. Table 9, below, portrays a portion of the results of a direct regression of Race/Ethnicity, College Skills Level (standing in for all developmental variables) and the remaining academic process variables upon Achiever Classification. As in the case of Table 9, identical in presentation format, only correlation statistics derived from the regression are given. Rows, depicting individual independent variable results, are ordered according to the n^{th}-order Pearson partial r weight of each factor, from high to low. The table's partial rs and r^2s provide a rough sense of the relative contribution each variable made toward determining likelihood of student achiever classification. When the effects of all other independent variables were controlled, course performance stood out as the single most powerful determinant of student success among the process variables tested (partial $r = .359$). Important secondary factors in terms of predictive weight were study load, attendance continuity and the variable representing general education requirements progress, Passing English 101, all showing partial rs in the .2 range. A bit surprisingly, with simultaneous controls for all other factors, the index standing in for the developmental component of the academic process proved to

make only a relatively minor impact on Achiever Classification; the regression partial r for College Skills Level came in at just .121, implying a significant but genuinely third-string order of influence. The remaining process variable – first year enrollment survival – barely registered as a predictor of achievement (partial r = .076).[30]

Table 9. Partial Pearson Correlations resulting from Regressing* Race and Academic Process Variables upon Academic Achievement ($R = .729$, $R^2 = .531$)

Variables in the Equation	0-Order r	0-Order r^2	Partial r	Partial r^2
Cumulative GPA 2.0 + /Under 2.0	.530	.281	.359	.129
Mean Study Load 9 + Hrs/Under 9 Hrs	.332	.110	.265	.070
Sequential Attendance/Some Stop Outs**	.466	.217	.236	.056
Passed English 101/Didn't Pass or Attempt	.571	.326	.226	.051
Basic College Skills Level	.390	.152	.121	.015
Attendance beyond Yr 1/Out before Yr 2.	.424	.180	.076	.006
African American/U.S. White	-.266	.051	-.052	.003

* All variables simultaneously with Achievement (Forced Entry)
** Stop-Out category includes student with fewer than three major terms

Finally, as expected, Table 9 marks Race/Ethnicity as the least predictive variable in the equation (partial $r = -.052$). This, of course, does not imply, following our initial discussion of the artificiality of correlating academic process variables with academic outcomes, that racial background has no bearing on which students succeed and which find their academic ambitions unfulfilled at PGCC. It simply means that race as a conditioner of achiever classification likelihood works mainly *through* the causal matrix of the academic process rather than *independently* of it. In other words, a student's racial background indirectly sets the odds for ultimate goal attainment because it more directly and more powerfully sets the odds that he or she takes a series of positive or negative *intermediate* steps which cumulatively lead to a happy or unhappy final destination.

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[30] Although, as other OIRA Fall 1990 cohort regression-based research not reported here suggests, this last finding needs to be put in perspective. When we regressed a larger set of process variables upon Achiever Classification, one in which the distinction was made between first year and subsequent year types of academic performance, the former emerged as a highly predictive class. In other words, first year survival is a factor of first year performance. In the regression analysis now being discussed, the independent criticality of the first year of enrollment for eventual academic achievement can not be properly assessed, as measured by the simple enrollment survival; the performance variables of this regression include first year effects, thus "draining away" the explanatory power of the survival variable in a way very misleading for the correct causal modelling of academic outcomes.

This brings us back to Table 9 data on the correlation of Race/Ethnicity with the individual variables representing the academic process at PGCC. The two racial segment columns under the heading Group Column Percent provide column-percentaged process by race cross-tabulations for each of the nine process variables tested, plus the *Eta* correlation summarizing the strength of relationship discovered in each cross-tabulation.

We have already established that students who came to PGCC testing highly in basic college skills (or if needing remediation completed their programs), who mostly undertook full-time study loads, persisted beyond the first year of attendance, avoided skipping semesters, made a start at fulfilling their general education requirements and who maintained a good grade point average were likely to end up in the Achiever category; while cohort members who came to college poorly prepared, participated in remediation programs, went mostly part-time, enrolled discontinuously, did not start on their general education requirement and failed to keep their grades up usually finished non-achievers after four years.

If African American cohort members placed into the achievement-discouraging categories of our academic process variables more often and into achievement-promoting categories less often than white cohort members, this would explain why we found a zero-order Achiever Classification Pearson correlation of -.266 for Race/Ethnicity (U.S. White = 0/African American = 1) but an all-process variable controlled correlation of only -.052. This fits the facts found in Table 9 nicely. In *every* process variable instance, a greater proportion of students of African heritage fell to the negative side while the distribution of students of European heritage tended to skew more to the positive side. For example, 43 percent of black cohort members exhibited lowest level basic college skills compared with only 17 percent of white members; conversely white students were almost three times more frequently found to possess Level I skills than African Americans (34 to 13 percent, respectively).

Since compared with their white counterparts African American cohort members always proved to be positioned disadvantageously no matter which process variable we looked at, the *Eta* weights for the process variable by race cross-tabulations can be taken not only as race differentiation summaries but also as relative measures of the degree of black-to-white achievement disadvantage each step represented: the higher the correlation, the more difficult the obstacle to progress for African Americans compared with U.S. Whites in the cohort.

Accordingly, then, the developmental component proved the major impediment to African American progress within the overall academic process – Mean Placement Test Score *Eta* = .491, Number of Developmental Programs Required .430, Effective College Skills Level .358.[31] Course performance turned out to put African American cohort members at somewhat less of a disadvantage relative to white cohort members, although the progress-impeding force here for black students was still quite strong – English 101 Success .281, Cumulative GPA .242. In comparison, the academic progress effects of Study Load (.151), First Year Enrollment Survival (.090) and Attendance Continuity (.062) seemed to have only marginally disadvantaged African American Fall 1990 freshmen compared to white students.

While the data portion of Table 9 just discussed gives some indication as to how selected discrete steps of the academic process at PGCC tended to promote or impede U.S. White and African American progress toward Achiever Classification, Table 10 below is an attempt to illustrate how the totality of the academic process impacted success likelihoods for students in the two racial segments of the cohort. The top portion of the table portrays the results of a series of cross-tabulations of Achiever Classification (Non-Achiever percentage not shown) with Racial Segment and three key academic process variables – the developmental summary index (dichotomized), study load and passing cumulative GPA.

Working leftward, the cross-tabulations are progressive, that is, each is based on the previous but adds a new population break. The left-most column gives the simple two-way cross between Achiever Classification and Race, the second shows the three-way cross when Skills Level is introduced (breaking the African American cell into African American/Skills III-IV and African American/Skills I-II, and the U.S. White cell similarly), the four-way third column shows those four cells split by the categories of study load into eight cells, and the last five-way column provides achiever percentages by the sixteen cells that appear when Passing GPA is taken into consideration. The effect is to project a sort of moving picture of changing achievement probabilities within the two racial segments under a fuller and fuller model of the academic process.

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[31]Interesting, the race group distribution pattern for Completion of Developmental Requirements did not suggest a significant white over African American advantage (Eta = .120). Completion of remediation was extremely difficult to achieve for both white and black developmental students (28 to 18 percent, respectively).

Table 10. Academic Process Cumulative Effect upon Achiever Classification
[% = Percent Achievers / ( ) = Cell N]

Racial Segment	Skills Level	Study Load	Passing GPA	
AFRICAN AMERICAN	LEVEL III-IV	9 HRS +	<C	0 % (251)
		6 % (446)	C+	14 % (195)
	9% (798)	<9 HRS	<C	1 % (253)
		12 % (352)	C+	40 % (100)
17 % (1,180)	LEVEL I-II	9 HRS +	<C	0 % (56)
		20 % (166)	C+	30 % (110)
	34 % (382)	<9 HRS	<C	5 % (88)
		44 % (216)	C+	72 % (128)
U.S. WHITES	LEVEL III-IV	9 HRS +	<C	0 % (54)
		6 % (170)	C+	9 % (116)
	17 % (300)	<9 HRS	<C	0 % (71)
		32 % (130)	C+	71 % (59)
41 % (896)	LEVEL I-II	9 HRS +	<C	0 % (44)
		21 % (159)	C+	29 % (115)
	53 % (596)	<9 HRS	<C	0 % (105)
		64 % (437)	C+	84 % (332)
% in Best Cell*				
Afr. American 100 %	32 %	18 %	11 %	
U.S. White 100 %	67 %	49 %	37 %	
A.A./White Ratio 1.00	.48	.38	.29	
Best Achiever Ratio				
A.A./White .41	.64	.69	.86	
Partial r** -.266	-.148	-.134	-.056	

* Shaded areas mark cells defined by category combinations with the highest Achiever probabilities
** Achiever by Race with control variables

33 BEST COPY AVAILABLE

Another way of looking at the top half of Table 10 is that its sort of African American and U.S. White cohort members according to different combinations of student academic process attributes allows the analyst to make systematic comparisons of the achievement rates of black and white student subgroups sharing the same academic process positions and characteristics. Of particular interest are achievement rates of cohort members from the two racial segments who fell into the paired "best cells" in each column (shaded areas of Table 10). For each racial segment, the best cell is the one the defining process characteristics of which work together to yield the highest achievement probability for the process model represented in the column. In the first column, the two best cells, by default, are the whole uncut racial segments themselves. In the second column they are defined by high college skills, in the third by high skills *and* full-time load, and in the last by high skills, full-time load *and* passing level GPA. The difference, then, between African American and U.S. White best cell achievement rates compared with the simple whole racial segment rate difference provides a graphic way of grasping the collective impact of the process variables represented by the column. Process effects are held constant and the pure racial effect comes to the fore because in each column we are examining the achievement rates for equally process-advantaged students from the two racial segments.

In addition to achievement rates, the top half of Table 10 also reports the number of students sorting into each cell (figures in parentheses). In their own way, these figures are as important as the cell achievement rates given. We have already remarked that Race/Ethnicity makes itself felt in the academic achievement equation in a round-about fashion, mainly through its robust correlations with the academic process variables leading to final academic outcomes. Therefore, data on the different ways students from the two racial segments distributed among the process-defined cells is critical for assessing the indirect operation of racial background upon Achiever Classification likelihoods.

The bottom portion of Table 10 is an attempt to pull out the important trends imbedded in the top half by means of a series of summary statistics. The row labelled Partial *r* gives the n^{th}-order Pearson correlation coefficient between Achiever Classification and Race/Ethnicity controlling for all process variables represented by the column (the cross-tabular data in each column, in effect, is the contingency table form of the regression of all column-associated independent variables with achievement). The row called Best Achiever Ratio expresses a column's African American best cell achiever percentage as a proportion of that for the parallel U.S. White cell – the greater the proportion shown, the more the black achievement rate resembles the white rate. The Percent in Best Cell rows focus on cell student headcount rather than cell achievement rates and provide three figures per column:

the number of black best cell students as a percentage of all African American students in the cohort, the number of white best cell students as a percentage of all European heritage, and the ratio of the black to the white percentage in each case – the smaller the ratio, the greater the overall disproportion of white students possessing the highest potential for success given their academic process characteristics.

The meaning of Table 10 for the interaction of Race/Ethnicity and academic achievement can be put more briefly:

(1) As a direct determinant of academic achievement, placement and performance within academic process matters far more than racial background. The table shows that as each of the key process variables (effective college skills, study load and course performance) is added to the multivariate mix, the achievement by race correlation drops – from -.266 to -.148 to -.134 and finally to an almost trivial -.056. Best cell achievement rates also illustrate this trend, the African American-to-white ratios rising from an initial base of .41 (black achiever rate 41 percent of white achiever rate) to .64 to .69 to the .86 three-process-variable case where black best cell performance (72 percent Achievers) nearly catches up to white best cell performance (84 percent Achievers).

(2) However, as an indirect determinant working through academic process variables, racial background remains important. This occurs in the way African American students as a group consistently and disproportionately tend to move through lower achievement probability points in the process, while whites are more likely to find the higher probability pathways, with cumulative effect.

This can be seen in Table 10 in the way the black-to-white percent in best cell ratios monotonically decline from the no process control case (1.00), to the one control case (.48), the two control case (.38), and finally to the three control case (.29). In more straight-forward percentage terms, by the time students have been thrice filtered in the academic process, the success odds for the best African American students (high effective college skills, full-time load, C or better cumulative GPA) nearly equal those for the best white students (72 to 84 percent Achievers, respectively); the problem is that there are proportionately so few African American best students (11 percent of all African American students) in comparison with white best students (37 percent of all white students). This is why, in the end, the overall achievement rate for the black segment of the cohort (17 percent Achievers) compares so poorly with the overall white achievement rate (41 percent).

Summary and Conclusions

The purpose of the research discussed in this report was to establish what role Race/Ethnicity played as a predictor of Fall 1990 freshman academic accomplishment after four years of study. A reasonable standard of academic success was taken to be the achievement of any one or combination of the following: an associate degree or other academic award, transfer to a senior institution, or sophomore in good standing status.

Here are our main social and educational background findings:

- In a practical, educational policy sense, Race/Ethnicity is a very important factor in academic achievement at PGCC. For example, after four years of study white cohort members were almost two and one-half times more likely to have classified as achievers by our definition (41 to 17 percent, respectively).

- From a purely statistical viewpoint, however, the link between race and academic achievement at PGCC turned out to be somewhat less impressive. For example, the basic Pearson correlation coefficient between race (African American = 1/Whites = 0) and Achiever Classification was -.266. A coefficient of this magnitude is considered to reflect only a low moderate level of association. Quantitative analysts would point out than a Pearson r of -.266 translates into 7 percent of the "total variance" of Achiever Classification tracing back to racial background. This leaves a full 93 percent to be explained by the operation of other variables.

- Race-conditioned Achievement probability did not turn on the simple white/non-white dichotomy. When Race/Ethnicity was represented by the full range of racial identities and national origin groups, we discovered that cohort members of Asian or Pacific Island descent showed the strongest achievement tendency (44 percent). White students came in a close second (41 percent), while achievement rates for students of Hispanic and African descent lagged far behind (20 and 18 percent, respectively).

- In fact, simple race classification was not always the determining factor in the way Race/Ethnicity predicted achievement. When citizenship was introduced as a qualifier of racial identity, we found that foreign students from black African countries out-achieved African Americans in our cohort by exactly two-to-one (34 to 17 percent Achievers, respectively). This finding, taken together with the high achievement tendency of Asian cohort members,

suggest that race group differences may reflect differences in cultural values accorded higher education.

- When the academic achievement impacts of other social and educational background variables were examined, we found that home neighborhood socio-economic status and racial composition also seemed to correlate well with Achiever Classification. But these associations proved to be mostly the spurious effect of high correlations of these variables with Race/Ethnicity. On the other hand, when social class and neighborhood racial composition were used as statistical controls, the achievement by race correlation was relatively unaffected.

- Student gender, age, marriage status and timing of college enrollment in terms of high school graduation date (immediate/delayed entry) appeared, at best, to be low level predictors of achievement. Controlling here for race, however, did uncover a phenomenon worth noting: the achievement correlations of these background variables, and also of social class and neighborhood racial composition, proved to be fairly significant within the white racial segment while almost nil within the African American segment.

- Only one background category seriously impacted on African American chances of academic success at PGCC – private secondary school attendance. Black students who had experienced this sort of secondary schooling exhibited Achiever tendencies nearly equal to that of white students generally.

- When all social and educational background variables were entered into a multiple regression analysis with Achiever Classification as the dependent variable, the resulting Pearson partial correlation coefficient (-.157) for Race/Ethnicity proved far and away the most powerful single predictor. Comparing this with the initial zero-order correlation between race and achievement (-.266) suggests that racial background's impact on student success cannot be explained away as a mere function of the operation of other background variables. On the other hand, most analysts would not consider a Pearson partial *r* of -.157 to signal a causal factor of any more than second tier explanatory power.

- In fact, the results of the regression analysis more generally could be taken as evidence that social and educational background variables, race included, may be somewhat over-rated as determinants of academic achievement; simultaneously, they proved to be able to account for only 12 percent of the total behavioral variance of the Achiever Classification dependent variable.

- When we ran separate within-racial cohort segment regressions, we found the social and educational characteristics of U.S. White students to be somewhat predictive of final study outcome ($R^2 = .136$). But knowing something about the socio-economic background, age and other such attributes of a randomly selected Fall 1990 African American freshman at PGCC improved our ability to guess his or her likelihood of academic success hardly at all ($R^2 = .018$). Black students tended to deviate little, according to their backgrounds, from the group achievement probability of .17.

The second objective of our research was to gauge how race interacted with the academic process at PGCC. Unlike social and educational background factors which are true independent variables, process indicators like number of remedial programs required, study load and course performance form an articulated system of sequential steps, of which Achiever Classification constituted the terminus. Thus, the purpose of correlation and regression analysis here was not the sorting out of genuine from spurious causal links. Instead, interpretation had to focus on how individual process steps modified the success probabilities of racial groups along the way to the final outcome. The main findings were:

- A regression of six key academic process variables plus Race/Ethnicity upon the Achiever Classification dependent variable resulted in an achievement partial correlation of only -.052 for the race variable. This, however, does not mean that racial background was of no importance for setting students on the path of study success. That level was genuinely indicated by the already noted basic zero-order (-.266) or the background variable-controlled partial *r* (-.157) correlations. What it *does* seem to indicate is that racial background affects success probability almost entirely as a function of the different ways different racial groups work through the different steps of the academic process.

- In the case of every process step tested, to a greater or lesser extent U.S. White students in our freshman cohort disproportionately concentrated in those process variable categories which enhanced achievement likelihood, while African American students gravitated to the opposite success probability- depressing categories.

- These tendencies were most pronounced when it came to the developmental component of the overall academic process. African American cohort members were far more likely than U.S. Whites to evidence low levels of college basic skills preparedness (low mean placement test scores 68 to 22 percent, respectively), and were far more likely to place into two or three remediation programs (53 to 16 percent, respectively).

- Less dramatically but still importantly, African American students lagged behind white cohort members in course performance (cumulative passing GPA– 45 to 69 percent, respectively) and in making progress toward fulfilling core curriculum requirements (passing English 101 – 33 to 61 percent, respectively). Black students also showed a somewhat lesser tendency, compared with white students, to enroll on a full-time basis (mean major term 9 hour plus study load – 52 to 63 percent, respectively).

- Only small differences could be found between black and white students when it came to developmental program completion rates, first year enrollment survival rates, and enrollment stop-out tendency, but small as these gaps were African Americans consistently fell to the disadvantaged side.

- Using just three key process variables (the Effective College Skills Index, Study Load and Passing GPA), we attempted a crude overall modelling of the cumulative impact of movement through the academic process upon final study outcome. In success probability terms, we found that the Achiever Classification chances for "best students" (high college skills, full-time, C grade average or better) began to approach 100 percent, and furthermore, that this was almost as true for African American "best students" (72 percent) as it was for those from the white cohort segment (84 percent). Roughly, students with similar academic records share similar academic fates, regardless of race – or at least the achievement gap between African American and white students narrows substantially.

- It was in process path terms that we found the reason for the initial achievement disparity between black and white cohort groups (17 to 41 percent). In the end, it traced back to this: white students much more frequently than their African American counterparts experienced the series of preliminary academic successes which collectively spelled ultimate success: in our model, almost two-fifths of the former (37 percent) compared with only one in ten (11 percent) of the latter classified as "best students."

It is possible that some of the weakness in the explanatory power of the social and educational background variables generally is a reflection of measurement inadequacy. This especially may be the case for the socio-economic indicator which substitutes home neighborhood average SES for individual student SES. Still, given the very poor results we believe it doubtful that a better constructed, more comprehensive set of measures of this type would have resulted in more than a marginal improvement in the Achiever Classification prediction. All this leads us to

speculate that a quantum leap in the power of an academic achievement model based on system exogenous variables can only be gained by going beyond factors of social position and identity to the direct inclusion of cultural and psychological factors. OIRA is presently carrying out attitude survey research on the PGCC *1992* Fall freshman cohort, in which psychometric measures feature prominently, and hopes to be able to report on this possibility in the near future.

What, however, may we conclude at this point about the academic impact of Race/Ethnicity? Though far and away the most potent of the background variables tested, it registered relatively mild statistical force in the model of academic achievement we were trying to construct. This assessment of the importance of racial background for academic achievement at PGCC is from a purely statistical perspective. If one's sole aim is to explore the place of racial background in building a *general model* of study success, than our research suggests that it is secondary. To an academic policy maker, however, there may be nothing secondary about it. It is a matter of great interest and concern to discover that the black student rate of academic achievement remains a fraction of that of white students, regardless of other social and educational characteristics considered.

How might PGCC engineer a narrowing of the 24 percent gap in academic achievement which currently separates our African American and white first-time students? The research findings on the interaction of race, achievement and the academic process may prove of material assistance here. Our principle discovery was that developmental placement and programming affected African American students more than any other component of the overall academic process. Although developmental status variables directly correlated with study success somewhat less than did process variables like course performance and study load, in terms of the sheer numbers of students with reduced achievement probabilities, no other portion of the system makes itself felt more in the sort of black and white students into four-year Achiever and Non-Achiever categories. African American students who needed and completed all developmental requirements had an achievement rate (41 percent) equal to white students generally. Assisting the three-fourths of African American students identified as needing remediation through completion of their developmental programs may be the most efficacious policy choice if the aim is to improve student achievement rates at Prince George's Community College.

Karl Boughan
Supervisor of Institutional Research

A*P*P*E*N*D*I*X

Appendix Table A. Subsample Sizes for Race and Social/Educational Background Variables			
Background Groups	All	U.S. White	African Amer.
RACE SAMPLE	2,076	896	1,180
High Neighborhood SES	414	351	63
Medium SES	1,130	492	638
Low SES	532	53	479
% Neighborhood 67% + White	333	299	34
33-66 % White	1,197	567	630
Under 33 % White	546	30	516
Private School HS Diploma	151	118	33
High Reputation PG Public HS	549	367	182
Other PG Public HS	766	180	586
Other HS History	610	231	379
Immediate Entry from HS	1,225	561	664
Delayed Entry	851	335	516
Under 20 Years Old	1,361	612	749
20 Years or Older	715	204	431
Never Married/Other Singles	1,828	780	1,048
Married-Living with Spouse	248	116	132
Females	1,213	496	717
Males	863	400	463

Appendix Table B. Subsample Sizes for Race and Selected Academic Process Variables			
Background Groups	All	U.S. White	African Amer.
RACE SAMPLE	2,076	896	1,180
Mean Placement Score 60 +	285	234	51
50 - 59	681	386	295
45 - 49	390	115	275
20 - 44	514	66	448
No Dev. Programs Required	889	583	306
1 Reuired	404	166	238
2 Required	382	94	288
3 Required	401	53	348
Dev. Required/Completed All	242	89	153
Dev. Required/Incomplete	945	224	721
College Skills Index - Level I	652	149	503
Level II	446	51	295
Level III	523	289	34
Level IV	455	307	148
Mean Term Load - 9 + Hours	1,135	567	568
Under 9 Credit Hours	941	329	612
Enrollment beyond Year 1	1,279	597	682
First Year Attendance Only	797	299	498
No Stop Outs (3 + Term Attenders)	698	345	353
Some Stopping Out	459	198	261
Gen. Ed. English 101 Passed	934	547	387
Not Passed or Not Attempted	1,142	349	793
Cumulative GPA - 2.0 or Better	1,155	622	533
Under 2.0 GPA	921	274	647